

REMARKS

Summary of the Office Action

Claims 3, 7, and 25 stand rejected under 35 U.S.C. § 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter that the Applicants regard as the invention.

Claims 5, 14, and 23 stand objected to under 37 C.F.R. § 1.75 (c) as being of improper dependent form for failing to further limit the subject matter of a previous claim.

Claims 1-5, 11-14, 21-23, and 29-30 stand rejected under 35 U.S.C. § 102 (e) as being anticipated by US patent No. 6, 295, 580 (hereinafter Sturges).

Claims 6-9, 15-19, and 24-27 stand rejected under 35 U.S.C. § 103 (a) as being unpatentable over Sturges in view of US patent No. 6,161,167 (hereinafter Witt).

Claims 10, 20 and 28 further stand rejected under 35 U.S.C. § 103 (a) as being unpatentable over Sturges in view of Witt, and further in view of US patent No. 6, 542, 921 (hereinafter Sager).

Response to § 112 Rejection, and 37 C.F.R. § 1.75(c) Objection

The Examiner is thanked for a thorough review of the claims, and for pointing out the identified errors. In response to the rejection of claims 3, 7, and 25 under 35 U.S.C. § 112, second paragraph, each of these claims has been amended to correct the grammatical errors therein.

Regarding the objection under 35 C.F.R. § 1.75 (c), claims 5 and 23 have been canceled, as indicated above.

Turning to claim 14, the Applicants believe this claim in fact to be in order. The Examiner will note that claim 14 concludes with the wording “if the selected way comprises either the first or the third way.” Similarly, claim 15 concludes with the wording “if the selected way comprises the second way.” Accordingly, claims 14 and 15 cover different scenarios, identified by the above quoted “if” statements.

Having amended the claims as indicated above, and submitted the above remarks, the Applicants believe that the rejection under 35 U.S.C. § 112, and the identified claim objections, have been addressed, and withdrawal of these rejections and objections is respectfully requested.

Response to § 102 Rejections

The Applicants respectfully traverse this rejection for the reasons set out below, and ask the Examiner for reconsideration.

To anticipate a claim, the reference must teach every element of the claim. “A claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference.” Verdegaal Bros. v. Union Oil Co. of California, 814 F.2d 628, 631, 2 USPQ2d 1051, 1053 (Fed. Cir. 1987).

STURGES DOES NOT TEACH EVERY ELEMENT OF EACH OF THE INDEPENDENT CLAIMS

Claim 1, for example, includes the following limitations:

dedicating a first portion of a resource exclusively to a first thread;

dedicating a second portion of the resource exclusively to a second thread; and

dynamically sharing a third portion of the resource between the first and second threads.

(Emphasis Added)

Sturges, on the other hand, fails to disclose a third portion of a resource that is dynamically shared between first and second threads, each of these first and second threads having an additional resource portion that is dedicated exclusively to the relevant thread. Sturges is relevant in that it does indicate the partitioning of a cache between a number of running processes (e.g., P1, P2, P3 and P4). However none of these processes has a page dedicated exclusively thereto, and in addition dynamically shares a page with another process that also has an additional page dedicated exclusively thereto. The Applicants believe that the disclosures in Sturges are best understood with reference to figures 6 and 7 of that reference. Sturges discloses in pertinent part the following:

On the left hand side of FIG. 6 is illustrated the sequence which a processor may undertake to run different processes P1, P2, P3, P4. On the right hand side of FIG. 5[sic] is an illustration of where these processes may expect their data to be held in memory. Thus, the data for the process P1 are held on page 0. The data for process P2 are held on pages 1 and 2. Data for processes P3 and P4 share page 3.

(Sturges, column 8, line 15-22)

FIG. 7 shows the partitioning of the cache while the processor is running process P1, and the change in the partitioning when the processor switches to running P3 etc. FIG. 6 also shows the TLB cache partition indicators for each case. Thus, on the left hand side FIG. 5 shows the cache partitioned while the processor is running processes P1 and P2. The process P1 may use banks B1 and B2 of the cache, but may not use banks B3 and B4. Conversely, the process P2 may use banks B3 and B4, but not banks B1 and B2. This can be seen in the TLB entries. This is, process P1 has a cache partition indicator allowing it to access banks B1 and B2, but not B3 and B4. Process P2 has cache partition indicators allowing them to access banks B3 and B4 but not P1 and B2. Process P3 has a cache partition indicator which prevents it from accessing the cache.

(Sturges, column 8, lines 38 - 52)

When the process P1 has finished executing, the processor can request kernel mode to allow it to alter the cache partition indicators for the processes. ... The change is illustrated on the right hand side of FIG. 6 [sic]. Thus, now the cache partition indicators prevent the process P1 from using the cache at all, but allocate banks B1 and B2 to the processes P3 and P4, by altering the cache partition indicator for processes P3 and P4 so that it can access these banks of the cache. Thus, when the processor is expecting to execute the process P3, it now has a cache facility.

Thus, a system has been described above which prevents concurrent processes from evicting each others data from the data cache. That is, the processes are mapped to disjoint data cache partitions. This effectively gives each process its own private data cache. While this does reduce the amount of data cache space available to both processes, it makes their performance much easier to predict accurately. The result of the system described herein is illustrated in FIG. 9.

(Sturges, column 8, line 61 – column 9, line 22)

To summarize, with reference to FIG. 7, this drawing shows two cache partitions between the described processes (P1-P4). In the partitioning illustrated on the left side of FIG. 7, process P1 may use banks B1 and B2, process P2 may use banks B3 and B4, while process P3 is prevented from accessing the cache.

Turning to the partitioning illustrated on the right hand side of FIG. 7, process P1 is prevented from utilizing the cache at all, process P2 can use banks B3 and B4, while processes P3 and P4 share banks B1 and B2.

It will be readily apparent from the above that Sturges simply fails to disclose dynamically sharing a third portion of a resource between first and second threads, each of those first and second threads having a respective further portion of the resource dedicated exclusively thereto. While Sturges does disclose the allocation of banks B1 and B2 to processes P3 and P4, each of the processes P3 and P4 does not have a further bank dedicated exclusively thereto.

The present invention may provide the advantage of guaranteeing each of the first and second threads with, for example, access to a minimum capacity of a particular resource, while at the same time allowing a further portion of the resource to be dynamically shared between these threads, according to the respective demands of these threads. The invention as defined by claim 1 may, for example, be utilized to provide a guaranteed minimum resource capacity to a particular thread, while also allowing additional resource capacity to be allocated to that thread depending upon the resource demands of that and other threads.

The Applicants believe that the above remarks are also relevant to distinguishing independent claims 11, 21 and 29 over the disclosures in Sturges.

In light of the above remarks, the Applicants believe that the rejections under 35 U.S.C. § 102 have been addressed, and withdrawal of these rejections is respectfully requested.

Response to § 103 Rejections

The Applicants respectfully traverse this rejection for the reasons set out below, and ask the Examiner for reconsideration.

To establish a **prima facie** case of **obviousness**, three basic criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations. The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, and not based on applicant's disclosure. In re Vaeck, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991).

**THE PRIOR ART REFERENCES DO NOT TEACH OR SUGGEST ALL CLAIM
LIMITATIONS, WHEN CONSIDERED SINGULARLY OR IN COMBINATION.**

With respect to claims 6-9, and 15-19, as these claims are dependent upon independent claims that are argued above to be allowable, the Applicants have addressed the rejections against these claims.

Turning to claim 24, and dependent claims 25-27, the Applicants have argued above that Sturges does not disclose a third resource portion that is shared between first and second threads, each of which has dedicated first and second portions of a relevant resource. For the same reasons argued above, the Applicants contend that Sturges and Witt, when considered singularly or in combination, simply do not disclose all claim limitations of claim 24.

As dependent claims are deemed to include all limitations of the claim from which they depend, the rejection of claims 25-27 is similarly addressed.

Claims 10, 20 and 28 are again dependent upon independent claims that are contended herein to be patentable, and the rejection of these claims is accordingly addressed.

In light of the above, the Applicants respectfully submit that the rejection under 35 U.S.C. § 103 has been overcome, and withdrawal of this rejection is therefore respectfully requested.

Having tendered the above remarks and amended the claims as indicated herein, the Applicants respectfully submit that all rejections and objections have been addressed and that the claims are now in a condition for allowance, which is earnestly solicited.

If there are any additional charges, please charge Deposit Account No. 02-2666. If a telephone interview would in any way expedite the prosecution of the present application, the Examiner is invited to contact André Marais at (408) 947-8200 ext. 204.

Respectfully submitted,
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Dated: 07/31/, 2003



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